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10/534012

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Düsseldorf 13.09.2004
Your ref.
Our ref. WY/wy 021035WO

International patent application PCT/IB02/04630
in the name of NOKIA CORPORATION

In response to the Written Opinion dated August 4, 2004, a new set of claims is submitted, which is to replace the originally filed set of claims.

It is respectfully requested that the examination is continued under consideration of the new set of claims and the following comments.

I. Pending claims

New claim 1 is based on original claim 1 restricted with the features of original claim 2.

New claims 2 to 14 correspond to original claims 3 to 15 which have been renumbered accordingly.

New claim 15 is based on original claim 16 restricted with the features of original claim 17.

New claims 16 to 23 correspond to original claims 18 to 25 which have been renumbered accordingly.

II. Subject matter of the application

The application comprises a claim directed at a mobile electronic system comprising the following features:

A Output means enabling a presentation of information to a user of the mobile electronic system.

B A 3D magnetometer performing magnetic measurements in three dimensions and providing data indicative of the current posture of the mobile electronic system based on the measurements.

C Processing means processing the data provided by the 3D magnetometer for enabling a posture related presentation of information via the output means.

D The processing includes selecting one of at least two different modes of presentation based on the data provided by the 3D magnetometer.

The use of a 3D magnetometer allows sensing the orientation of a device and in addition its current inclination. This information may be used for new or enhanced functions of a mobile electronic system. (page 4, last paragraph) Selecting a mode of presentation depending on the detected orientation/inclination enables in addition presentations which are only appropriate with certain orientations/inclinations. (page 10, 3rd paragraph)

The application comprises in addition a claim 15 directed at a corresponding method. The application further comprises claims directed at a complementary unit for a mobile electronic system (claim 12), to a user equipment for a mobile electronic system (claim 13) and to a user equipment comprising a mobile electronic system (claim 14).

III. Prior art

The examiner cites four documents for supporting his estimation:

US 2002/0056202 A1 (D1)

This document describes a three axis magnetic sensor, which can detect three axial components of the magnetic vector of the terrestrial magnetism. (par. 0008)

In addition to the three axis magnetic sensor, a tilt sensor may be employed, for example in form of an acceleration sensor. (par. 0011, lines 1-6 and par. 0012)

Figure 9 presents a cellular phone, which comprises the magnetic sensor, a map data processing unit and a display. The map data processing unit processes map data based on a magnetic

declination provided by the magnetic sensor, and the display displays the processed map data on screen. (par. 0046-0048)

The magnetic sensor can be built into portable equipment such as the cellular phone and mobile terminal. (par. 0053)

US 2002/0100178 A1 (D2)

This document presents a three-axis magnetometer which is connected via a microprocessor to a user output. (Figure 3) The magnetometer is fixed with respect to a vehicle or other equipment on which it is installed. (par. 0056) Figure 4 presents the internal 3-dimensional coordinate system of the compass.

In another implementation, in addition accelerometers for 3 dimensions are provided, which are processed by a microprocessor together with the magnetometer signals. The microprocessor calculates the azimuth angle, which is output to the user via, for example, a conventional RS-232 data interface. (par. 0059-0061; Fig. 5)

Accelerator measurements G_{MEAS} and magnetometer measurements H_{MEAS} can be processed for a calibration and compensation of the electronic compass. (par. 0072, 0075 and equations in par. 0072-0133)

It is mentioned that various filters can be used in a calibration process. (par. 0135)

JP 2002 168629 A (D3)

This document relates to a built in or externally connected magnetic direction detector for a portable terminal device. Sensors of two or more axes are mentioned. (Abstract)

WO 02/009396 A2 (D4)

In this document, it is proposed that a mobile phone comprises a compass for orientation, the indications-figures of which can be seen on the display of the phone. Alternatively, the compass can be separately carried out and fixed to the phone. (claim 8, page 10, lines 21-24)

IV. Novelty and inventive step

Independent claims

The examiner considers the subject matter of independent claims 1 and 15 not to be new in view of any of documents D1, D2 and D3.

Claim 1

The cited documents D1, D2 and D3 disclose the use of a 3D magnetometer in mobile equipment.

None of these documents discloses, however, that processing means select one of at least two different modes of presentation based on data provided by the 3D magnetometer. (feature D of claim 1)

Thus, the subject matter of claim 1 is new. It is also based on an inventive step, as will be explained in the following.

Proceeding from any of the cited documents, it is an objective problem how to enable the use of new or enhanced functions of a mobile electronic system. (page 3, 1st paragraph of the description)

This problem is solved in the system of claim 1 with feature D. Some (more advanced) modes of presentation might not be appropriate with certain inclinations of the system. It is thus an advantage of the proposed mobile electronic system that a mode may only be selected if the current orientation/inclination of the system is suitable for this mode.

An example for such a selection of an appropriate presentation mode is presented on page 9, last paragraph to page 11, 3rd paragraph. Here, it is indicated that a presentation of a traditional compass only makes sense when the display is positioned basically horizontally. A first mode, in which a traditional compass is presented, is therefore only selected when the display is positioned basically horizontally. When the degree of inclination of the display exceeds a predetermined value, in contrast, a second mode is selected, in which for example numeral values are presented.

In the cited prior art documents, possibly the presentation may vary with the orientation/inclination, but there is no suggestion or hint to a person skilled in the art that the mode of presentation may vary depending on the orientation/inclination.

Accordingly, the subject matter of claim 1 has to be considered to be new and inventive.

Claim 15

The independent method claim comprises steps which correspond to the features of device claim 1. Thus, the same comments apply here.

Dependent claims

The examiner states for most of the dependent claims simply that they are not new in view of any of documents D1, D2 and D3, without indicating a specific basis in the cited prior art documents. The

subject matter of the dependent claims has to be considered to be new and to be based on an inventive step already due to the reference of the dependent claims to a respective new and inventive independent claim. For some of the dependent claims, features are pointed out nevertheless, which are new and inventive by themselves.

Claims 3/17

A 3D display is not disclosed in the cited prior art documents. It is an advantage of such a 3D compass that it enables a new user experience with a mobile electronic system (page 5, par. 5).

Claims 4/18

A 3D display of a floating compass is not disclosed in the cited prior art documents. It is an advantage of such a floating compass that it enables a new user experience with a mobile electronic system (page 5, par. 5).

Claims 9/23

Using a complementary filter for combining magnetometer based data and accelerometer based data, both indicating a current heading of a mobile electronic device, is not to be proposed in the cited prior art documents. It is an advantage of a complementary filtering that it allows filtering the noise in both types of data without distorting the signal. (page 17, lines 4/5) In document D2, it is only mentioned in general that various filters can be used in a calibration process. The advantageous use of a complementary filter as proposed is not suggested.

V. Final comments

Summarized, it has been shown that the subject matter of the pending claims is new and based on an inventive step.

It is therefore expected that a positive International Preliminary Examination Report can now be issued.

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Encl.

Claims

1. Mobile electronic system comprising
   - output means (12,42) enabling a presentation of information to a user of said mobile electronic system;
   - a 3D magnetometer (51) performing magnetic measurements in three dimensions and providing data indicative of the current posture of said mobile electronic system based on said measurements; and
   - processing means (52,54) processing said data provided by said 3D magnetometer (51) for enabling a posture related presentation of information via said output means (12,42), including selecting one of at least two different modes of presentation based on said data provided by said 3D magnetometer.

2. Mobile electronic system according to claim 1, wherein said processing means present compass information (13,14,15,43-46) via said output means (12,42) based on said data provided by said 3D magnetometer.

3. Mobile electronic system according to claim 2, wherein said output means comprise a 3D display (42) on which said compass information (43-46) is presented.

4. Mobile electronic system according to claim 3, wherein said processing means present a floating compass (43-46) on said 3D display (42) based on said data provided by said 3D magnetometer.

5. Mobile electronic system according to one of the preceding claims, further comprising additional sensor means (50) providing additional measurement data, wherein said processing means use said additional measurement data in addition for enabling a posture related presentation of information (43-46) via said output means (42).

6. Mobile electronic system according to claim 5, wherein said processing means use said additional measurement data provided by said additional sensor means at least for one of the following: adjusting a presentation of information via said output means and filtering signals provided by said 3D magnetometer.

7. Mobile electronic system according to claim 5 or 6, wherein said sensor means comprise a 2D or 3D linear accelerometer measuring the acceleration of said mobile electronic system in three dimensions.

8. Mobile electronic system according to one of claims 5 to 7, wherein said sensor means comprise a 3D angular accelerometer (50) measuring the angular acceleration of said mobile electronic system in three dimensions.

9. Mobile electronic system according to claim 8, wherein said 3D magnetometer (51) provides first data indicating a current heading of said mobile

electronic system, wherein said 3D angular accelerometer (50) provides second data indicating a current heading of said mobile electronic system, and wherein said processing means comprise a complementary filter (52-54) combining said first and said second data indicating a current heading of said mobile electronic system.

10. Mobile electronic system according to one of the preceding claims realizing an inertial navigation system.

11. Mobile electronic system according to one of the preceding claims, wherein at least said output means are comprised in a user equipment, wherein at least said 3D magnetometer is comprised in a complementary unit external to said user equipment, wherein said user equipment and said complementary unit comprise respective connection means rigidly and electrically connecting said complementary unit and said user equipment for providing signals which are based on magnetic measurements of said 3D magnetometer to said user equipment.

12. Complementary unit for a mobile electronic system according to claim 11.

13. User equipment for a mobile electronic system according to claim 11.

14. User equipment comprising a mobile electronic system according to one of claims 1 to 11.

15. Method for use in a mobile electronic system, said method comprising:
    - performing magnetic measurements in three dimensions in said mobile electronic system;
    - determining data indicative of the current posture of said mobile electronic system based on said performed magnetic measurements; and
    - processing said data for enabling a posture related presentation of information to a user of said mobile electronic system, said processing comprising selecting one of at least two different modes of presentation based on said data indicative of the current posture of said mobile electronic system.

16. Method according to claim 15, comprising presenting compass information (13,14,15,43-46) obtained in said processing.

17. Method according to claim 16, comprising presenting said compass information (43-46) on a 3D display (42).

18. Method according to claim 17, comprising presenting a floating compass (43-46) on a 3D display (42).

19. Method according to one of claims 14 to 18, further comprising performing additional measurements in said mobile electronic system, wherein said processing is based in addition on measurement data resulting in said additional measurements.

20. Method according to claim 19, wherein said processing comprises using said additional measurement data at least for one of the following: adjusting a presentation of information and filtering signals resulting in said performed magnetic measurements.

21. Method according to claim 19 or 20, wherein performing said additional measurements comprises measuring the acceleration of said mobile electronic system in three dimensions.

22. Method according to one of claims 19 to 21, wherein performing said additional measurements comprises measuring the angular acceleration of said mobile electronic system in three dimensions.

23. Method according to claim 22, wherein said processing comprises combining first data indicating a current heading of said mobile electronic system and second data indicating a current heading of said mobile electronic system by a complementary filtering, which first data is based on said magnetic measurements and which second data is based on said angular acceleration measurement.